

We claim:

1. A method for detecting faults in transparent material, said method comprising the steps of:

a) irradiating a definite partial volume of the transparent material with a first radiation source;

b) coupling light of a second radiation source into the transparent material so that an optical path of said light in said partial volume extends exclusively in an interior of the transparent material; and

c) detecting scattered light from said fault in said partial volume, bright field absorption from said fault in said partial volume and/or deflection of light of said first radiation source by said fault in said partial volume in order to detect the presence of said fault in said partial volume of the transparent material.

2. The method as defined in claim 1, further comprising measuring the material with local spatial resolution.

3. The method as defined in claim 1, further comprising determining a fault type of said fault from a ratio of a bright field signal to a scattered light signal or from a ratio of a deflection signal to said scattered light signal.

4. The method as defined in claim 1, wherein said second radiation source emits monochromatic light.
5. The method as defined in claim 1, wherein said light from said second radiation source is coupled into a flat glass sheet or a flat glass plate.
6. The method as defined in claim 1, wherein said second radiation source emits green light.
7. The method as defined in claim 6, wherein said green light has a wavelength of 532 nm.
8. The method as defined in claim 1, wherein said second radiation source emits red light.
9. The method as defined in claim 1, wherein said light of the second radiation source coupled into the transparent material has an intensity that is about ten times higher at an edge of the transparent material than in a center of the transparent material.
10. The method as defined in claim 9, wherein said light of the second radiation source is coupled into the transparent material so that said light experiences total reflection in the interior of the transparent material.

11. The method as defined in claim 5, wherein said light of the second radiation source is coupled into the flat glass sheet or flat glass plate so that said light experiences total reflection in the interior of the transparent material.

12. The method as defined in claim 5, wherein said light of the second radiation source is coupled into the transparent material through a transparent liquid.

13. The method as defined in claim 1, wherein both of said radiation sources emit pulsed light and one of the radiation sources emits pulses of said pulsed light only in pause intervals between pulses from another of the radiation sources.

14. The method as defined in claim 1, wherein said first radiation source is divided into two parts and said two parts emit different colored light.

15. An apparatus for detecting faults in transparent material, said apparatus comprising

- a first radiation source for illumination of a definite partial volume of the transparent material,

- a detector for light originating from said partial volume; and

- a second radiation source arranged in relation to the transparent material so that an associated optical path extends exclusively in an interior of the transparent material.

16. The apparatus as defined in claim 15, wherein said first radiation source comprises two parts and said two parts emit light of different intensities or wavelengths.

17. The apparatus as defined in claim 16, wherein said two parts of the first radiation source comprise different colored LEDs.

18. The apparatus as defined in claim 15, wherein said first radiation source is pulsed.

19. The apparatus as defined in claim 16, wherein said detector is arranged for detection of bright field light in such a way that said detector detects radiation from both of said two parts of the first radiation source.

20. The apparatus as defined in claim 15, wherein one of said first radiation source and said second radiation source emits in a green wavelength range.

21. The apparatus as defined in claim 15, wherein said second radiation source is a laser.

22. The apparatus as defined in claim 21, wherein said laser has an emission frequency of 532 nm.

23. The apparatus as defined in claim 21, wherein said laser is a pulsed laser.

24. The apparatus as defined in claim 15, further comprising an electronic device for controlling said first radiation source and said second radiation source so that the first radiation source and the second radiation source emit only time-shifted light.

25. The apparatus as defined in claim 15, wherein said detector detects a bright field signal, a scattered light signal and/or a deflection signal.

26. The apparatus as defined in claim 15, wherein said detector is a CCD camera.